STATISTICAL BULLETIN
Metropolitan Life Insurance Co.

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THE INCREASING MORTALITY FROM DIABETES.

Interest in diabetes has been greatly increased recently, first because of the discovery and use of insulin, a promising specific for the disease, and second, because of the considerable increase in the mortality from this condition. The general tendency of diabetes mortality has been upward for fully twenty years. Since 1919, moreover, the rise has been continuous and considerable. It will be of interest, therefore, to summarize some of the outstanding facts with reference to the mortality from diabetes in order that a truer valuation may be made of the damage done by this condition.

A publication recently issued by the Census Bureau shows very striking geographical differences in the mortality rate resulting from diabetes. New York State, for example, shows the highest white incidence with a rate of nearly 22 per 100,000. In Tennessee, the lowest rate for the white population is found, namely, slightly over six per 100,000. The figures vary interestingly between these two extremes in the several parts of the country. The data for the Industrial policyholders of the Metropolitan for a series of years including 1922, show very much the same geographical distributions as those described for the general population. The States of New York, New Jersey, Massachusetts, and Pennsylvania show very high rates. The lowest figures are found in the Southern and Western States.

These differences are entirely consistent with what is known with regard to the disease. The rates are higher in the Northern States than in the Southern, in part, because of the well-known fact that white people have higher death rates from diabetes than colored. The mortality rates are about one-fifth higher among the whites than among the colored policyholders insured in the Metropolitan Industrial Department. But it must not be assumed that white persons of all

nationalities are equally susceptible to diabetes. There is another strong racial factor involved, and this partially explains the differences in the rates in various states. New York and New Jersey lead the country, very probably because of the large number of persons of foreign stocks who are particularly susceptible to diabetes, especially Jews and Irish. Much lower rates are uniformly found among the native-born, and this is reflected in the lower rates in those states whose people are pre-eminently of native stock. Apparent exceptions to this general rule are such states as Maine, New Hampshire and Vermont. This may well be due to the greater concentration of old persons in these states, which fact may explain their high diabetes rates as well as their high cancer rates. The diabetes death rate rises very rapidly with advancing age, and communities with a large proportion of old people would show, on that account alone, a higher mortality incidence.

The recent discovery and the apparently successful use of insulin as a remedy brings into relief certain characteristics of the disease which may lead clinicians to associate diabetes with other glandular disorders. The theory of insulin treatment is to supply certain substances normally produced by the pancreas and whose production has been inhibited by the destruction of the Islands of Langerhans. The results can be compared with those obtained by the use of thyroid extract in diseases dependent upon the proper functioning of the thyroid gland. Now, it is a matter of great significance that several diseases such as diabetes, goitre, Addison's disease, etc., resulting from the malfunctioning of endocrine glands, should show these three characteristics in common; first, a very much higher incidence of the disease among females than among males; second, a much higher incidence among whites than among the colored; third, a continuous increase in the rate with advancing age. It is possible that the similarity is only accidental, but this is hardly likely in view of the anatomical and physiological similarities of the causes of the diseases. Possibly the sex and racial differences will suggest to physiologists lines of research leading to the discovery of some of the factors in the causation of these disorders which are still somewhat obscure.

FURTHER FACTS ON BODY-WEIGHT AND LONGEVITY.

In the STATISTICAL BULLETIN for November, 1922, we referred in general terms to the life insurance mortality experience on risks who are under or over the average weight for height and age. In the

present note, we shall consider the question of *optimum weight*, that is, that weight in relation to height and age with which the most favorable mortality experience is associated.

A distinction must first be made between the optimum weight and the average weight. In the past, the average has often been assumed to be the best weight and tables of averages have been very widely circulated and used as guides by physicians, nutrition and clinic workers and others concerned with the health of children and adults. In this way, there sprang up the general assumption that deviation from the average weight was undersirable and indicated trouble. Children who were as little as 10 per cent. below the average have been considered malnourished and adults who were 20 per cent. or more above or below the average have been looked upon as impaired more or less seriously. We now know that such assumptions about the normality of the average weight are erroneous. In fact, it can be shown that the most favorable mortality experience is often found among risks whose weights are considerably below or above the averages for their height and age.

At ages under 30 years, the lowest mortality rates among insured persons are found in risks whose weights are above average. An excess of about 10 pounds in weight above the average produces the most favorable mortality rates between the ages of 20 and 24 years. This excess tapers off until about age 30, where the most favorable mortality is found among persons of approximately average weight. After age 30, the more favorable mortality rates are found among persons whose weights are below average. The amount below average increases with advancing age and at age 50, individuals appear to be at their best when their weight is as much as 30 to 40 pounds below the average.

It seems clear, therefore, that for persons beyond 30, underweight is distinctly an advantage so far as a favorable prospect of mortality is concerned. It is erroneous to suppose that weight should increase with age, as we have been led to believe by the tables for average weights. This increase with advancing age is, of course, a very common occurrence, but there is every indication that it is a disadvantage and should be carefully avoided. The public health movement in its attack upon the diseases of adult and later life will do well to bear this fact in mind.

The body-weight of persons in adult and later life gives a fair indication of the amount of work which is thrown upon the digestive, circulatory and excretory systems. As men grow older, the diffi-

culties of normal functioning of these systems increase with the accumulation of impairments. At the same time, persons as they advance in age seem to grow more inclined to take in more food, especially proteins and fats, and less inclined to indulge in wholesome exercise. This has a tendency to place more and more of a strain upon the food utilization machinery and consequently, to hasten the break-down of the organs concerned in these processes. A realization of these facts on the part of the public would lead, no doubt, to marked changes in habits of diet and exercise and to an amelioration of conditions which to-day lead to so much mortality from diseases of the heart, blood vessels and kidneys. There is abundant clinical evidence to prove that through the restriction of diet and the encouragement of exercise in adults the conditions premonitory of organic impairment and eventual break-down of the circulatory and excretory systems have been averted. These facts from life insurance records only tend to reinforce what hygienists have been advocating for years.

MORTALITY EXPERIENCE OF THE LAST QUARTER OF 1922.

A most remarkable health record was established for Metropolitan Industrial policyholders in the final quarter of 1922. Their death rate for this period was 8.1 per 1,000, which is the lowest ever recorded for the last quarter of any year. This is true for both white and colored policyholders. The effect of these very favorable figures was to offset the higher rates of the first two quarters of the year, and to bring the whole year's record down to a point almost identical with that of 1921, which was the best year in the Company's history.

The table on page 5 presents the death rates for the final quarters of 1922, 1921 and 1920.

Death Rates per 100,000 Persons Exposed. LAST QUARTERS of 1920, 1921 and 1922 Compared by Color for Principal Causes of Death. Industrial Department, Metropolitan Life Insurance Company—Premium-paying Business.

CAUSE OF DEATH	DEATH RATES PER 100,000 PERSONS EXPOSED					
	WHITE			COLORED		
	Oct.–Dec. 1922	Oct.–Dec. 1921	Oct.–Dec. 1920	Oct.–Dec. 1922	Oct.–Dec. 1921	Oct.–Dec. 1920
ALL CAUSES OF DEATH	749.2	771.9	771.9	1264.0	1292.8	1303.7
Typhoid fever	6.2	6.6	7.5	14.1	17.1	14.6
Measles	3.1	.8	2.7	2.2	.5	.3
Scarlet fever	4.6	5.6	7.1	2.2	.7	1.3
Whooping cough	2.2	1.3	3.8	2.9	2.2	6.3
Diphtheria and croup	26.5	32.8	32.2	10.1	17.6	9.3
Influenza	8.1	5.4	5.5	15.6	12.5	14.1
Meningococcus meningitis	.4	.4	.7	†	.2	.3
Tuberculosis—all forms	81.4	83.2	97.2	217.4	239.4	259.9
Tuberculosis of respiratory system	73.7	75.1	87.2	197.5	219.8	235.3
Tuberculosis of the meninges, etc	3.3	3.0	4.8	6.0	4.6	6.8
Other forms of tuberculosis	4.4	5.1	5.3	13.9	14.9	17.8
Cerebral hemorrhage; apoplexy	53.9	60.0	53.5	88.8	94.4	92.2
Organic diseases of the heart	106.2	110.0	97.6	178.8	170.4	152.2
Total respiratory diseases	67.3	68.5	66.7	126.4	122.3	115.3
Bronchitis	4.7	5.8	5.6	8.1	9.5	10.3
Bronchopneumonia	21.2	20.1	20.5	23.0	28.9	25.9
Pneumonia-lobar and undefined	33.5	34.5	33.0	84.7	71.2	67.3
Other diseases of respiratory system	8.0	8.1	7.7	10.5	12.7	11.8
Diarrhea and enteritis	9.6	12.6	15.9	10.8	10.8	17.1
Under 2 years	5.1	5.7	7.4	3.1	1.7	4.3
2 years and over	4.5	6.9	8.5	7.7	9.0	12.8
Acute nephritis	5.1	5.4	5.0	18.7	17.1	19.1
Chronic nephritis	63.5	61.6	59.1	104.9	110.5	104.5
Total puerperal state	15.1	15.6	15.7	22.7	25.4	27.9
Puerperal septicemia	5.3	6.0	6.1	10.5	8.6	14.8
Puerperal albuminuria and convulsions	4.0	4.0	4.0	4.5	8.6	5.3
Other diseases of puerperal state	5.8	5.6	5.6	7.7	8.3	7.8
Total external causes*	66.2	63.0	67.6	102.2	91.5	97.9
Suicides	6.5	7.5	6.6	3.6	6.6	3.0
Homicides	2.2	4.5	3.1	34.5	29.6	29.4
Accidental and unspecified violence**	57.4	50.9	57.5	64.2	55.0	65.5
Accidental drowning	3.0	2.4	3.6	4.3	2.9	5.0
Automobile accidents	16.5	14.4	14.6	10.8	9.5	6.5
War deaths	.1	.2	.3	†	.2	†
All other and ill-defined causes of death	229.7	239.2	234.3	346.4	360.2	371.9

*Includes "War deaths." **Excludes "War deaths." †No deaths.

MORTALITY AT AGE DIVISIONS IN 1922.

In the STATISTICAL BULLETIN for January it was announced that the death rate in 1922 among the Industrial population of the United States and Canada was the lowest for any year in the last decade with the single exception of 1921. The mortality data for 1922 have now been analyzed further and we are able to show comparisons between 1921 and 1922 for the different age divisions of the Industrial populations of the two countries.

The age divisions under 25 years all showed substantial improvement during 1922 over 1921 although the death rate at all ages combined increased very slightly. The mortality among children under 15 years improved 12 per cent. This was due chiefly to lower death rates for diphtheria, tuberculosis, scarlet fever and whooping cough. The decrease in the mortality from infectious diseases of children gives promise that there will be fewer impairments of heart and kidney and this may affect appreciably future death rates for cardiorenal diseases among young adults. What the public health movement accomplishes in the child population *now* should make itself felt in lower adult death rates ten or twenty years hence.

Beyond age 25, however, mortality rates for 1922 show distinct increases as follows: 4 per cent. in the age division 25 to 34 years; 2 per cent. in the age group 35 to 44 years; and 8 per cent. between the ages of 45 and 64 years. These increases arose out of the influenza epidemic of the early months of last year and from the higher death rate for heart and kidney diseases.

The following table gives the facts by age divisions for 1922, 1921 and 1911; and also shows the per cent. declines in 1922 as compared with the prior year and with the year 1911.

Death Rates per 1,000—All Causes of Death—By Broad Age Periods, 1922, 1921 and 1911—Metropolitan Life Insurance Company—Industrial Department.

Age Period	1922	1921	1911	Per cent. decline since:	
				1921	1911
All ages—one and over	8.772	8.706	12.530	**.8***	30.0
1 to 15	3.6	4.1	6.2	12.2	41.9
15 to 24	4.1	4.3	5.9	4.7	30.5
25 to 34	5.8	5.6	9.5	**3.6**	38.9
35 to 44	8.7	8.5	13.7	**2.4**	36.5
45 to 64	20.2	18.7	26.2	**8.0**	22.9
65 and over	69.9	69.3	81.3	**.9**	14.0

*Figures in bold-face denote increase.

The age data for certain of the principal diseases may likewise serve the public health movement. Tuberculosis of the respiratory system, for example, registered a decline of 2.6 per cent. at all ages combined as compared with 1921. Improvement was shown in 1922 for every age group between one and 45 years. The largest per cent.

decrease was recorded for the age group one to 14 years, 7.7 per cent. The decline of 6.6 per cent. between 15 and 24 years is almost as favorable. From 25 to 34 years only a very small decline (0.5 per cent.) was registered, but between 35 and 44 years another gratifying fall in the rate (5.0 per cent.) is shown. After age 45, however, there is a very different picture. Between 45 and 64 years the death rate for respiratory tuberculosis *increased* 3.7 per cent. in 1922, and after age 65 a rise of 5.3 per cent. was recorded. We must not underestimate the importance of even these slight increases in the higher age groups. The older ages are also important ones with respect to pulmonary tuberculosis. The death rate between 45 and 64 years in 1922 was only 18 per cent. lower than the maximum rate for any age group, namely, 25 to 34 years, and the rate at 65 and over was only 23 per cent. below this maximum.

The facts for organic heart disease by age are similar to those for respiratory tuberculosis. Declines in mortality occurred between the ages of one to 14 and 15 to 24. By far the greatest per cent. decline was recorded between ages one and 14 years, 14.8 per cent. There was a 3.1 per cent. decrease at ages 15 to 24. In the age groups 25 to 44, the death rates were virtually identical in 1922 and 1921. After age 45, however, organic heart disease mortality was considerably higher in 1922. The per cent. increase between 45 and 64 years was 17.5, or considerably more than one-sixth. The amount of this increase was sufficient to raise the rate for all ages combined over that for the preceding year. After age 65 there was a 4.7 per cent. rise in the death rate.

Influenza and pneumonia combined caused more deaths in every age group in 1922 than in 1921. The per cent. increases ranged from a minimum of 10.2 for the age group one to 14 years to 41.6 for those aged 25 to 34 years. Despite the influenza flurry of the early months of 1922 the death rates for influenza and pneumonia combined were lower at every age group than they were in 1911.

HEALTH RECORD FOR FEBRUARY, 1923.

The death rate for February (11.5 per 1,000) is the highest recorded for that month among the Industrial policyholders since 1920, at which time the first recrudescence of the great influenza pandemic of 1918 was at its height. As compared with February, 1922, there was an increase of 7.7 per cent. in the mortality; comparison with January, 1923, shows a rise of 9.8 per cent.

The presence of epidemic influenza is the explanation for the high February death rate. We need not go beyond this in seeking the cause of the high mortality now prevailing. Influenza and pneumonia alone are charged with 2,698 of the 11,999 February deaths from all causes, that is, with nearly one-quarter of the total for the month. But we cannot measure the effect of epidemic influenza on the death rate in terms of deaths that are recorded in statistical tables under influenza and pneumonia. Experience in prior epidemics has demonstrated conclusively that influenza is a distinct factor in hastening the deaths of many persons who have chronic ailments. This doubtless accounts for much of the 8 per cent. increase in the mortality from organic heart disease in February as well as for the increases of more than 4 per cent. for chronic nephritis and about 4 per cent. for tuberculosis.

The more recent developments of the current influenza outbreak have shown conclusively that we are not dealing at this time with a mere repetition, if somewhat earlier, of the influenza flurry that occurred early in 1922. When the present outbreak began it was believed by many that we were to again experience practically what occurred last year, except for the fact that this present outbreak began, relatively, a month earlier. We now know that the present situation, although by no means as serious as in the world pandemic, or even in the 1920 influenza recrudescence, is much graver than that of last year. There has been a well defined spread of the disease from the Carolinas, Georgia and Tennessee, where it became epidemic in December, to practically all sections of the United States and to Canada. Again, the present outbreak is extending over a longer period than that of last year. The general death rate in the large cities of the United States has maintained an upward tendency, almost without a break, since the beginning of the year; and more important still is the fact that it has continued to rise at a time of the year when it had begun to fall in 1922.

Withal, this fact stands out; a general outbreak of even a relatively mild type of influenza such as the present, is a serious condition indeed from the standpoint of public health. Despite the fact that the influenza which has prevailed since December is not, by and large, of the virulent form that prevailed in 1918, it has been responsible, directly or indirectly, for the deaths of many thousands of persons in the United States and Canada. While the type of influenza now prevailing does not run quickly into pneumonia and cause death in anywhere near the same proportion of cases as did the 1918 type, it

nevertheless, does take this course in a large enough proportion of cases to be the *direct* cause of a large increase in the death rate, and to be an *indirect* cause of this rise as the result of hastening the deaths of other thousands who were the victims of various forms of chronic disease. We cannot but conclude that when epidemic influenza prevails, no matter how mild the type, the country is confronting a public health problem of the first magnitude.

The record for the first two months of 1923 indicates that we are to have another "measles year." The death rate for this disease in February (10.6 per 100,000) was over four times that recorded in February, 1922, and there was an increase of more than 25 per cent. over the figure for January, 1923. Whooping cough mortality, also, is more than double what it was during the early months of last year. The diphtheria situation is more satisfactory than in January. Tuberculosis shows a rising death rate as compared with January and with February, 1922. The same is true of cerebral hemorrhage, organic heart disease and chronic nephritis. Puerperal conditions, although registering higher death rates than in January, show, despite the prevalence of epidemic influenza, a decline as compared with February of last year.

The automobile accident situation becomes more discouraging month after month. It is true the February death rate (9.4 per 1,000) is lower than for the preceding month (10.8); it would be strange, indeed, if it did not show some decline in view of seasonal conditions which have precluded the operation of many motor vehicles; but when comparison is made with the rate for February of 1922 (7.8) an increase of 20 per cent. is shown.

There is one outstanding bright spot in the mortality record of the first two months in 1923: the cancer death rate has shown a gratifying decline as compared with last year; in February this amounted to 9 per cent.

The general death rate for the large cities of the United States in February was 17.4 per 1,000. This is higher than for the previous month (15.1) and for February, 1922 (16.4). The morbidity from many diseases increased in February, notably influenza, measles, poliomyelitis, scarlet fever and whooping cough. All of these conditions were also more prevalent than during February a year ago. There were, however, fewer reported cases of diphtheria, smallpox and typhoid fever.

Every state for which records are available has been reporting higher measles morbidity this year than last, except Colorado,

Nebraska and Washington. Large increases for February were noted for California, Georgia, Kansas and North Carolina. The disease has been epidemic in Defiance, Ohio, and in Allentown and Marietta, Pennsylvania.

The presence of scarlet fever was responsible for the suspension of classes for a time at Bates College, Lewiston, Maine. Gettysburg College, in Pennsylvania, was closed for a week on account of this disease. At Glen Ridge, New Jersey, the Mountainside Hospital was closed for two weeks and it became necessary also to close the schools.

Smallpox cases were fewer than in January and in February, 1922.

Rising morbidity for whooping cough has been noted, especially in Michigan, Kansas and North Carolina.

Acute poliomyelitis, usually a summer disease, is being reported with unusual frequency for this time of the year. This applies particularly to New York City and to the State of Connecticut.

Influenza morbidity has been rising quite generally throughout the country, but during the final week of February the cases declined in most States. The disease appears to be increasing in California and Oregon on the Pacific Coast, and in Louisiana, West Virginia, Nebraska and Wisconsin. The schools in several Ohio communities were closed because of influenza during February. Other cities where this measure had to be taken are Bayonne, New Jersey; Palmyra, Missouri, and Bessemer and Tecumseh, Michigan. In Chicago, the Health Commissioner issued emergency orders requiring the sterilization of dishes and drinking glasses in hospitals and restaurants.

The table below shows the mortality among Industrial policyholders for February, 1923, January, 1923; February, 1922, and for the year 1922:

METROPOLITAN LIFE INSURANCE COMPANY.

Death Rates per 100,000 for Principal Causes, Premium-Paying Business in Industrial Department.

(Annual Basis)

MONTHS OF JANUARY AND FEBRUARY, 1923, AND OF FEBRUARY, 1922

CAUSES OF DEATH	RATE PER 100,000 LIVES EXPOSED			
	Feb., 1923	Jan., 1923	Feb., 1922	Year 1922†
TOTAL—ALL CAUSES	1148.7	1046.3	1067.0	877.2
Typhoid fever	2.8	4.2	2.0	5.6
Measles	10.6	8.4	2.6	4.3
Scarlet fever	4.4	5.9	9.5	4.8
Whooping cough	6.4	3.7	3.0	2.6
Diphtheria	17.3	27.1	23.1	17.8
Influenza	90.2	37.8	48.7	21.5
Tuberculosis (all forms)	119.1	114.7	114.7	113.4
Tuberculosis of resp'y system	109.8	106.9	106.0	102.9
Cancer	70.0	71.8	76.6	71.5
Diabetes mellitus	21.9	20.0	*	17.0
Cerebral hemorrhage	73.3	72.1	72.9	62.4
Organic diseases of heart	169.3	157.2	161.9	126.0
Pneumonia (all forms)	168.1	131.7	140.8	73.3
Other respiratory diseases	22.3	20.4	22.0	13.6
Diarrhea and enteritis	5.9	6.2	6.7	10.7
Bright's disease (chronic nephritis)	84.0	80.6	80.0	69.9
Puerperal state	19.0	17.9	22.8	18.9
Suicides	5.5	7.1	6.7	7.4
Homicides	5.1	7.2	4.9	6.2
Other external causes (excluding suicides and homicides)	52.0	56.7	49.3	57.7
Traumatism by automobile	9.4	10.8	7.8	13.5
All other causes	201.6	195.4	218.5	172.6

*Not available. †Based on provisional estimate of lives exposed to risk in 1922.

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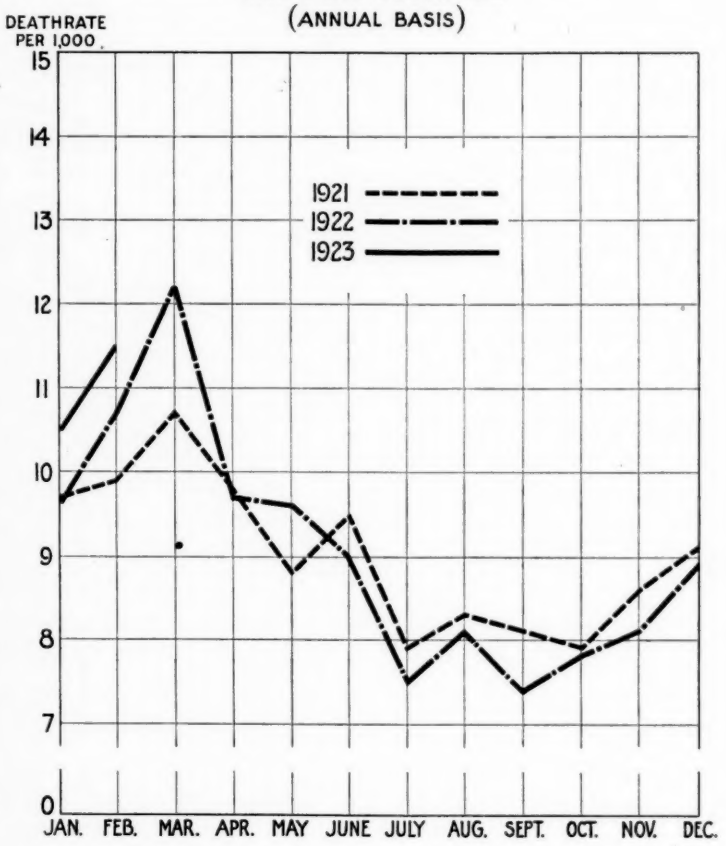
DEATHRATE PER 1,000
in SPECIFIED MONTHS *of*
1921-1922-1923

METROPOLITAN LIFE INSURANCE COMPANY
INDUSTRIAL DEPARTMENT
(ANNUAL BASIS)



	1921	1922	1923
JAN.	9.7	9.6	10.5
FEB.	9.9	10.7	11.5
MAR.	10.7	12.2	
APR.	9.8	9.7	
MAY	8.8	9.6	
JUNE	9.5	9.0	

	1921	1922	1923
JULY	7.9	7.5	
AUG.	8.3	8.1	
SEPT.	8.1	7.4	
OCT.	7.9	7.8	
NOV.	8.6	8.1	
DEC.	9.1	8.9	

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